

This Listing of Claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

1. (Currently Amended) A method for fabricating a Bi ~~thin~~ film, ~~wherein a Bi thin film is formed by comprising electrodepositing the Bi film from~~ a Bi solution onto a substrate ~~in the at a~~ deposition ratio ~~rate~~ of 0.1 – 10  $\mu\text{m}/\text{min}$  by applying a current within a range of 1 – 100 mA to the Bi solution at room temperature.
2. (Original) The method of claim 1, wherein the Bi solution is  $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ .
3. (Currently Amended) The method of claim 1, wherein the ~~fabricated~~ Bi ~~thin~~ film has a MR (magnetoresistance) ratio ~~of~~ approximately 600 % at room temperature and not less than 80,000 % at 4 K ~~when under~~ a magnetic field of 9T ~~is applied~~.
4. (Currently Amended) The method of claim 1, further comprising:  
depositing a Pt or an Au underlayer ~~to be used as an a~~ working electrode onto the substrate ~~before depositing the Bi film, so as to have wherein the Pt or the Au underlayer has a thickness~~ within a range of 50 – 500 Å ~~before depositing a Bi thin film~~.
5. (Original) The method of claim 1, wherein carbon is used as a counter electrode.
6. (Currently Amended) The method of claim 1, further comprising:  
heat processing the ~~fabricated~~ Bi ~~thin~~ film at a temperature within a range of 250 – 270 °C.
7. (Currently Amended) ~~The A~~ method of claim 1 ~~for fabricating a Bi film~~, ~~wherein a~~ comprising forming the Bi ~~thin~~ film ~~is formed~~ onto a substrate ~~in the at a~~ deposition ratio ~~rate~~ of 0.1 – 10  $\mu\text{m}/\text{min}$  by a-sputtering ~~method~~ in a ~~vacuumized~~ vacuum chamber.

8. (Currently Amended) The method of claim 7, wherein the ~~fabricated~~ Bi ~~thin~~ film has a MR (magnetoresistance) ratio of approximately 600 % at room temperature and not less than 30,000 % at 4 K ~~when under~~ a magnetic field of 9T ~~is applied~~.
9. (Currently Amended) The method of claim 7, further comprising:  
heat processing the ~~fabricated~~ Bi ~~thin~~ film at a temperature within a range of 250 – 270 °C.
10. (Currently Amended) A magnetic field sensor comprising a mesa and a magnetic substance, wherein a ~~the~~ mesa comprises the Bi ~~thin~~ film fabricated by the method of claim 1 ~~or claim 7 is~~ fabricated as a mesa by photolithography or electron beam lithography, and a ~~the~~ magnetic substance having ~~great a~~ saturation magnetization and ~~a~~ permeability is formed at ~~both~~ plurality of sides of the Bi mesa as a flux concentrator.
11. (Currently Amended) A spin FET (spin-polarized field effect transistor), comprising:  
a gate;  
an insulating layer ~~formed on the~~ a bottom portion of the gate;  
~~a source/drain region formed at left/right sides~~ a side of the insulating layer ~~by using~~   
~~magnetic metal or a magnetic semiconductor having great spin polarization;~~ and  
a spin channel ~~formed by using a~~ comprising the Bi ~~thin~~ film fabricated according to claim 1 ~~or claim 7~~.
12. (Currently Amended) A spin memory device, wherein a ~~the~~ spin memory device includes ~~comprises~~ a gate, a Bi spin channel fabricated by a ~~the~~ method according to claim 1 ~~or claim 7 and formed on the bottom~~ a portion of the gate and a source/drain region ~~formed at left/right sides~~ a side of the spin channel, ~~by using magnetic metal or a magnetic semiconductor having great spin polarization, and wherein~~ the spin memory device controls resistance by an external magnetic field.
13. (New) A magnetic field sensor comprising a mesa and a magnetic substance, wherein a ~~the~~ mesa comprises the Bi film fabricated by the method of claim 7, and a ~~the~~ magnetic substance

having a saturation magnetization and a permeability is formed at plurality of sides of the mesa as a flux concentrator.

14. (New) A spin FET (spin-polarized field effect transistor), comprising:

a gate;

an insulating layer on a portion of the gate;

a source/drain region at a side of the insulating layer; and

a spin channel comprising the Bi film fabricated according to claim 7.

15. (New) The spin FET of claim 11, wherein the source/drain region is formed at a left or right side of the insulating layer by using magnetic metal or a magnetic semiconductor having great spin polarization.

16. (New) The spin FET of claim 14, wherein the source/drain region is formed at a left or right side of the insulating layer by using magnetic metal or a magnetic semiconductor having great spin polarization.

17. (New) A spin memory device, wherein the spin memory device comprises a gate, a Bi spin channel fabricated by a the method according to claim 7 on a portion of the gate and a source/drain region at a side of the spin channel, wherein the spin memory device controls resistance by an external magnetic field.

18. (New) The spin memory device of claim 12 wherein the source/drain region is formed at a side of the spin channel by using magnetic metal or a magnetic semiconductor having a spin polarization.

19. (New) The spin memory device of claim 17 wherein the source/drain region is formed at a side of the spin channel by using magnetic metal or a magnetic semiconductor having a spin polarization.

20. (New) The magnetic field sensor of claim 10, wherein the mesa produced by photolithography or electron beam lithography.

21. (New) The magnetic field sensor of claim 13, wherein the mesa produced by photolithography or electron beam lithography.